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EXAMINER

HU, SHOUXIANG

ART UNIT PAPER NUMBER

2811

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,575

Applicant(s)

DEN, TOHRU

Examiner

Shouxiang Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 9 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 11 and 13-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 07 July 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Pending and Active Claims

1. In view of the previous Office action, claim 1-15 are pending in this application; and claims 1-8, 10-11 and 13-15 remain active in this Office action.

Drawings

2. New corrected drawings are required in this application because the proposed drawing correction filed on July 7, 2003, has been approved. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Objections

3. Claims 1-8, 10-11 and 13-15 are objected to because of the following informalities and/or defects:

4. In claims 1 and 14, the terms of "the first group" and " the second group" should read as: --the first group of pores-- and --the second group of pores--, respectively.

5. Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper

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dependent form, or rewrite the claim(s) in independent form. The subject matter that the pores of the first group surrounding the pores of the second group is already recited in claim 1.

6. Claims 8 and 11 each recite the term of "the pores of the second group serving as the writing wires", but, it is the conducting material filled in the pores, not the pores themselves, that can serve as the writing wire(s).

7. In claim 15, the term of "by the first region" should read as: -by a current in the first region".

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1-8, 10-11 and 13-15, insofar as being supported by the elected species, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

10. Claims 1 and 14 each recite or imply the combination of the subject matters that the second group has pores, and that the second group is surrounded by the first group. It then may be interpreted as meaning: the multiple of pores of the second group are

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surrounded by the multiple of pores of the first group, which is not fully supported by the original disclosure, since according to the original disclosure (as shown in Fig. 2A) there is only a single pore (corresponding to element 11 from the second group) that is surrounded by a given set of the pores from the first group.

In addition, claim 15 recites the subject matter that the plurality of second regions are independent. It is not fully supported by the original disclosure either, since according to the original disclosure (as shown in Fig. 2A), the given set of the second regions, i.e., the magnetic materials in the pores (12) have to be magnetized along a same circular direction. Therefore, as least in this regard, these given set of the second regions are not exactly fully independent from each other.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claim 15, insofar as being in compliance with 35 U.S.C. 112, is rejected under 35 U.S.C. 102(b) as being anticipated by Prinz (US 5,541,868).

Prinz discloses a memory cell for having information of a bit (Figs. 9 and 10), comprising: a first region (912) for producing a magnetic field; and a plurality of second regions (within the magnetic material 909), wherein the second regions are independent

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to other regions and are magnetized along a desired direction by a current in the first region.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 1-8, 10-11 and 13-14, insofar as being in compliance with 35 U.S.C. 112 and as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. ("Iwasaki"; JP 2000-31462; 01/28/2000; also see US 6,278,231, of record, for its English translation) in view of Prinz (US 5,541,868).

Iwasaki discloses a magnetic device (see Figs. 16 and col. 23, lines 15-51, in US 6,278,231), comprising: a membrane layer (13; alumina) having cut-through fine pores; wirings on both faces of the membrane layer; and a substrate (82), wherein, since each of the pores is filled with a Co-Cu GMR layered column which is inherently conductive, the fine pores in Fig. 16 of Iwasaki inherently includes a first group of pores filled with a layered column formed of stacking Co/Cu layers, and a second group of pores filled with a conductive column adjacent to the first group of pores, wherein each of the second group pores can be regarded as being surrounded by a given sets of the first group pores.

Iwasaki does not expressly disclose that the conductive column in the second group of pores can be used as a writing wire for writing magnetization configurations into the magnetic layers in the nearby first group of pores. However, one of ordinary skill in the art would readily recognize that magnetization configurations in magnetic layers nearby a conductive column can be readily written with reduced adverse cross-talk by passing a writing current through the conductive column, as evidenced in Prinz (see Figs. 9 and 10, and col. 2, lines 33-37). In Figs. 9 and 10, Prinz teaches to form a magnetic device by forming a conductive column (912) in a pore as a writing wire for writing magnetization configurations into the nearby magnetic layer (909).

Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to make the magnetic device of Iwasaki with at least one of the conductive columns being used as a writing wire for writing magnetization configurations into the adjacent magnetic layers in the surrounding pores, as taught in Prinz, so that a magnetic layer with reduced adverse cross-talk would be obtained.

Regarding claims 3 and 4, it is noted that the pores that are adjacent to the above first and second group of pores can be regarded as a third group of pores in which the magnetic layers can inherently function to intercept a magnetic field surrounding a unit cell, since at least some of the magnetic layers in a GMR element normally have a relatively lower coercivity and thus can function as a magnetic shielding material.

Regarding claim 7, the pores in Iwasaki are naturally arranged in a honeycomb arrangement (see Fig. 21C).

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Regarding claims 10 and 11, it is noted that one of ordinary skill in the art would readily recognize that the individual GMR elements (or the layered columns) can also be arranged in a rectangular array with a square arrangement, as the writing magnetic field generated from the central writing wire (as the one in Prinz) still has a same writing strength for the square-arranged adjacent GMR elements.

Regarding claim 13, the diameter of the pore in Iwasaki can be a value such as 160nm (see col. 1, lines 51-59) and the thickness of the alumina layer therein can be about 500nm (see col. 20, lines 64-65, and col. 27, lines 16), which would inherently result in an L/S ratio of about 2.5×10^5 .

Response to Arguments

15. Applicant's arguments filed on 7/7/03 have been fully considered but they are not persuasive.

Applicant's main arguments include: Iwasaki and Prinz fail to teach the claimed invention as Prinz only teaches an annular GMR-based memory element. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, Iwasaki already teaches that each of the pores is filled with a Co-Cu GMR layered column, which is inherently conductive. And, the fine pores in Fig. 16 of Iwasaki inherently includes a first group of pores filled with a layered column formed of stacking

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Co/Cu layers, and a second group of pores filled with a conductive column adjacent to the first group of pores, wherein each of the second group pores can be regarded as being surrounded by a given sets of the first group pores. Prinz is cited as evidence that it is art-known that magnetization configurations in magnetic layers nearby a conductive column can be readily written with reduced adverse cross-talk by passing a writing current through the conductive column, as Prinz teaches to form a magnetic device by forming a conductive column (912) in a pore as a writing wire for writing magnetization configurations into the nearby regions in the magnetic layer (909). Accordingly, it would be well within the ordinary skill in the art to make the magnetic device of Iwasaki with at least one of the conductive columns being used as a writing wire for writing magnetization configurations into the adjacent magnetic layers in the surrounding pores, as taught in Prinz, so that a magnetic layer with reduced adverse cross-talk would be obtained. And, in such a collectively taught device, each of the writing pores would be readable as one of the recited second group pores; and every other pore immediately surrounding such a writing pore would be readable as one of the first group pores.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703)306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH
September 19, 2003

A handwritten signature in black ink, appearing to read 'Shouxiang Hu', with a long horizontal flourish extending to the right.

SHOUXIANG HU
PRIMARY EXAMINER